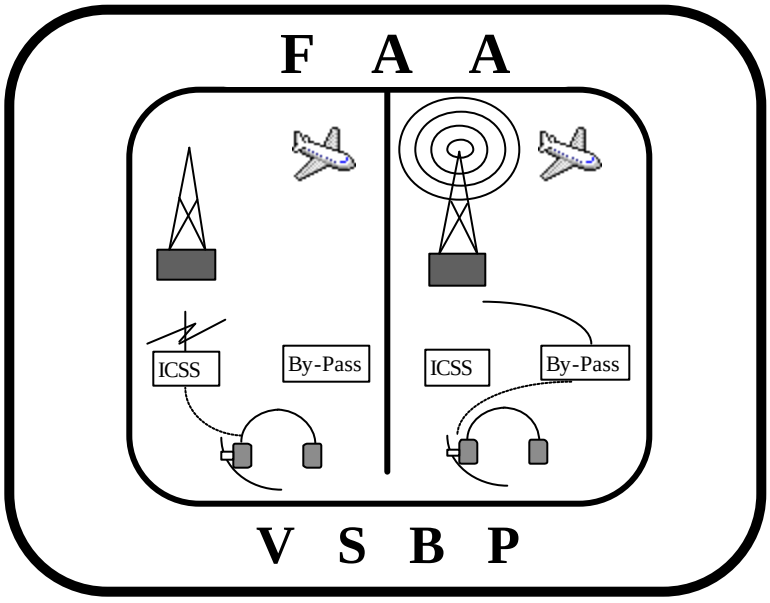

VOICE SWITCH BY-PASS

(VSBP)

Operational Concept Manual

Prepared By AND-320/CEXEC

PREFACE

This letter transmits the **Operational Concept Document** for the **Voice Switch By-Pass (VSBP)** system.

A full or partial failure of a terminal voice switching system has the potential of interrupting critical communications between controlled aircraft and the controlling facility. The VSBP system is designed to provide air traffic controllers emergency access to specific air-to-ground radio frequencies in the event of such a failure. The VSBP system will be installed by on-site airway facilities personnel at designated terminal air traffic control facilities. The VSBP is a standard design system, with FAA Depot support, that is totally independent of the voice switch.

This document contains: a description of the VSBP; a discussion on when and how to use it; a glossary; installation instructions; and information on training, spares and how to obtain assistance.

For more information or questions concerning the Voice Switch By Pass system, not covered in this concept document, you may contact the appropriate member of the Integrated Product Team for Voice Switching and Recording.

APPROVAL

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Voice Switching and Recording	Voice Switching and Recording
AND-320	ATR-110.6

VSBP

Voice Switch By-Pass

1. *What is VSBP?*

A full or partial failure of a terminal voice switching system (ICSS, RDVS, STVS, ETVS) has the potential of interrupting critical communications between controlled aircraft and the controlling facility. The **Voice Switch By-Pass (VSBP**) system is designed to provide air traffic controllers emergency access to specific air-to-ground (A/G) radio frequencies in the event of such a failure. The VSBP will be installed at designated terminal air traffic control facilities. The VSBP is a standard design system, with FAA Depot support, that is totally independent of the voice switch.

The VSBP allows for three types of circuits in the By-Pass mode. The circuit types include:

1. Type 1 enables 1 (one) operator to communicate on 1 (one) specific frequency.

2. Type 2 enables 1 (one) operator to communicate on 2 (two) specific frequencies.

3. Type 3 enables 2 (two) operators to communicate on 1 (one) specific frequency.

The VSBP system is activated for the designated frequency(s) by removing the headset/handset plug from the primary voice switch jack and inserting the headset/handset plug into the separate VSBP Jackbox module. This manual plug insertion energizes a series of relays to switch the designated A/G transceiver over to the VSBP.

The VSBP is pre-wired to either the main or standby transceiver for the designated frequency(s) and any changes must be made through the radio patch panel in the equipment room. While a frequency is accessed through the VSBP system it will not be available through the voice switch at any other positions.

When the VSBP is activated, the A/G audio that was being recorded through the ICSS will be switched to the By-Pass System and legal recording will continue. Be advised, however that when the VSBP is activated, **only** A/G communication is recorded. VSBP recording will occur on the normal position channel, and no additional recording channels are required for the VSBP.

2. *When should the VSBP be used ?*

The VSBP should be used, as air traffic control conditions dictate, if access to critical A/G communications through the voice switch is lost. The selection of frequencies that are designated for bypass at each position is pre-set at the discretion of the facility.

A. What to expect when the VSBP is activated

Under the following four scenarios, the controller can take the corresponding recommended action to attempt restoration of A/G communications:

1. The ICSS (Voice Switch) is operational, but the Main radio is not operational. A/G communication on a single frequency is lost during a conversation, and there are no other indications of failure. If the frequency has a back-up transmitter/receiver and changing to the back-up (Main or Standby) clears the problem there is no need to activate the VSBP. If the outage is due to a failure of the designated radio transmitter/receiver (normally Main), switching to VSBP **will not** restore communication since VSBP will only access the same transmitter/receiver.

2. The ICSS (Voice Switch) is not operational. A/G communication with the Main radio selected is lost, and switching to the Standby radio does not help. Since it appears that both Main and Standby radios are inoperative, the problem could be in the ICSS. The VSBP can be activated and A/G communication and recording **should** be restored.

3. The ICSS (Voice Switch) position is not operational. A/G and G/G communication at a position is lost, but all other positions appear normal. It appears that the problem is related to a specific position. The VSBP can be activated and A/G communication and recording **should** be restored on the designated frequency.

4. Main facility power has failed and the ICSS (Voice Switch) is operating on internal back-up power. After approximately 30 minutes all communication is lost. The VSBP can be activated and A/G communication and recording **should** be restored. The VSBP is provided with its own back-up power source. Emergency A/G communication will be available for at least an additional 30 minutes, providing the radios are powered.

B. VSBP "DON'TS"

1. Only 1 (one) operator at a time may be authorized to access a specific frequency through the VSBP. The VSBP does not have lockout capability so if more than one operator accesses the same frequency through VSBP, neither operator will be able to communicate effectively. Local procedures for its use must be developed if a frequency is designated for VSBP use at more than one position.

2. Leaving a headset/handset plugged into the VSBP and continuing to operate G/G using another headset/handset is not recommended. Activating the VSBP enables position recording of the A/G communication only, but **no** G/G communication will be recorded.

3. Do not plug a handset into the VSBP and then lay it on the console. The VSBP is not provided with a speaker, and so all A/G audio is routed through the headset/handset earpiece.

C. Routine Checks

Airways facilities and air traffic personnel should perform periodic checks of the VSBP as defined in the appropriate publications. As a minimum, air traffic controllers should perform daily operational checks of the VSBP. The airways facilities personnel should perform an operational availability check of each VSBP channel on a periodic basis as defined in the ICSS/VSBP maintenance manuals.

D. Maintenance

In preparation, for other than minor system checks, the Technician should do one of the following to reduce the impact on Air Traffic operations.

1. Obtain from Air Traffic a release of both Main and Standby frequencies associated with the VSBP equipment needing maintenance.

2. Install strapping clips at the main facility demarcation block to eliminate the VSBP from the A/G communication path for all affected frequencies.

3. *Glossary*

A. VSBP or Voice Switch By-Pass is a system that provides a backup for the voice switch to maintain A/G communications. The VSBP does not allow for automatic switching of frequencies or radio equipment.

B. Recorder - A unit that records the conversation between the controller and all other parties. The FAA Orders require this recording to provide a record of all communications.

C. Jackbox - A small bright orange box containing a concentric control knob and the headset/handset jack receptacle. The knob controls both the volume gain and sidetone, and the jack makes the VSBP active when plugged into the jack receptacle.

D. Sidetone - Feedback from the controller's voice is heard in their earpiece and is designed to allow controllers to experience a natural talking environment by hearing their voice.

E. Demarc Blocks - The connection points between the VSBP switching relays and the facility. They allow for a positive connection and reconfiguration of frequencies.

F. Relays - The actual contacts controlled electromagnetically to switch the transmit/receive connections from the ICSS to the VSBP.

G. UPS or Uninterruptable Power Supply. The UPS is designed to provide power to the system if there is a power outage. It is rated to allow a minimum of 30 minutes of power after the loss of all ICSS power.

H. PTT or Push-To-Talk is the controller function occurring when the PTT switch is manually depressed allowing the controller to transmit on the designated frequency.

I. ICSS or Integrated Communication Switching System. The primary communications management system providing the air-to-ground and ground-to-ground interfaces used by the air traffic controllers. This system provides frequency and position switching to meet the needs of everyday air traffic control scenarios.

4. *What does VSBP consist of?*

The components that make up the VSBP are:

A. Jackbox - The physical entity the controller plugs the headset/handset jack into. There is one Jackbox each for circuit Type 1 and Type 2 and 2 (two) Jackboxes for Type 3. Receive and Sidetone Audio volume is controlled by a concentric control knob on the Jackbox. The outer ring controls the sidetone and the inner knob controls the audio volume.

B. Cables - The VSBP uses 7 (seven) radio cables, and up to 4 (four) Jackbox cables per rack unit. All cables connect into the back-plane of the VSBP rack unit. The 7 radio cables also connect into the two Demarcation blocks mounted in the rack.

C. Equipment Rack - The individual components are mounted in a Tellabs Bucket mounting assembly which mounts to the 19" rack.

D. Relays - The devices controlled electromagnetically to switch the transmit/receive connections from the ICSS to the VSBP. The relays mount in the Tellabs Bucket and have no user operational switches or settings.

E. Power Supply - The VSBP is powered by a dual voltage, fully regulated power supply. The power supply is mounted in the Tellabs bucket and has a front mounted light to monitor operation. The power supply voltage switch should be set on the 24VDC setting and needs no maintenance.

F. Fuse Block - The fuse block allows for over current protection on all electrical power circuits and is mounted adjacent to the Power Supply in the Tellabs Bucket. A malfunction light is located at the top of the fuse block.

5. *What is needed to install the VSBP units?*

A. Set Up

Airways Facilities Personnel will install the VSBP at the site. The equipment will arrive assembled, tested at the factory and ready for immediate installation. A Technical Instruction (T.I.) manual and Instructional Video is included with the By-Pass delivery and should be used to facilitate a proper installation.

B. What is Supplied?

The following will be supplied:

1. Jackboxes and interconnecting cables
2. Switching equipment and interconnecting cables pre-wired to the punch blocks
3. UPS with standard three wire power cable
4. T.I. manual for installation

C. What about cables?

All cables internal of the Demarc will be delivered with the VSBP unit. Included in the package will be:

1. Jackbox Cable - This cable runs from the back of the Jackbox to the back of the Backplane.

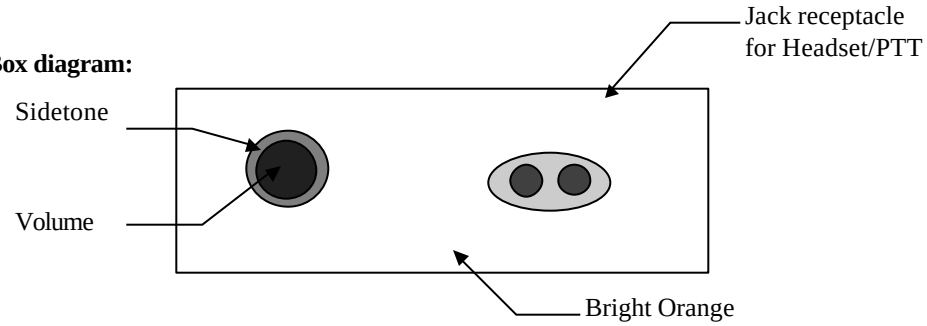
2. Demarc Block - This is used to connect the VSBP into the existing facility system. The cables from the main facility Demarc to the VSBP Demarc are not provided.

Note: A single circuit 115VAC power is required for VSBP operation. The facility will provide cabling from the facility power source to the VSBP cabinet mounted A.C. receptacle.

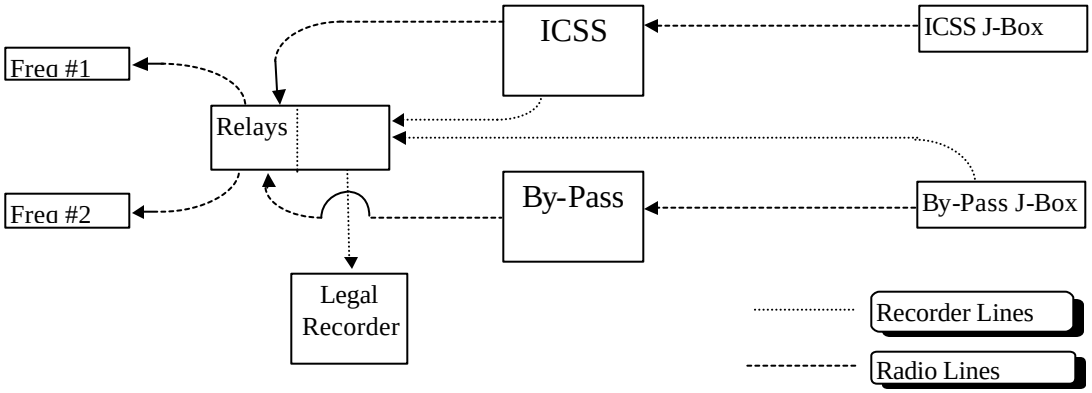
6. *What are the VSBP Basic system configuration and physical attributes?*

A. Physical Diagrams

JackBox diagram:



Functional Diagram:



B. Components

The switching and control unit is a modular design with the COTS components installed in a Tellabs bucket assembly, mounted in a standard 19 inch rack. Vertical rack size is determined by site requirement. All equipment conforms to the applicable requirements of FAA-G-2100F. The switching and control unit is designed such that a common Backplane will accommodate the one position - one frequency, one position- two frequencies or two positions - one frequency configurations identified in Section 1.

7. *How will I receive training on the VSBP?*

Training for air traffic controllers will come from two sources:

A. Video Tape - DME has produced a video tape titled "Voice Switch By-Pass, Video Training Session" and covers such topics as: Maintenance, Testing, Use, and Components. This Video tape will be sent to each site as ordered and has no restrictions on copying or viewing.

B. AF Training - FAA Academy will train personnel in the use, maintenance and repair of the By-Pass in conjunction with the standard ICSS course.

8. *What about Spares?*

Every site will receive one spare power supply and additional spares will be provided to all sites based on the number of components at each site. For every five of the following LRUs installed, the site will receive one of each of these items:

1. Relay Module
2. Jackbox
3. Dual Data Bridge

9. *Whom do I call when I need Help?*

The point of contact for assistance in all program matters is Mr. Roger E. Smith, AND-320 and can be reached at 202-358-5074. The point of contact for Life Cycle Support is Charles Satterwhite 405-954-4804, FAA Logistics Center/ Depot. The LIS System applies to VSBP. The VSBP equipment is under OEM warranty. Appendix A to this manual contains the operating policy for Warranty Service.

10. *Who was awarded the VSBP contract?*

DME Corp., was awarded the VSBP contract in August 1995. The DME Corporation, established in 1976, is located in Fort Lauderdale, Florida. DME Corporation has been providing commercial products and services for a number of years. Some of their contracts with the FAA include:

MALSER	Medium Intensity Approach Lighting System
DVOR	Doppler VOR Kits
TALA	Threshold Approach Lighting Assembly

DASI	Digital Altimeter Setting Indicator
SDM	Snow Depth Monitor

Appendix A

Voice Switch Bypass (VSBP) Warranty Service Operating Policy

The Voice Switching and Recording Product Team (AND-320) has established the following Warranty Service Operating Policy as guidance in determining when it is appropriate to use Priority 1 (P1), Priority 2 (P2), or Priority 5 (P5). The turnaround times (priorities) as defined in the VSBP contract are as follows:

a. Priority 1 is emergency replacement which shall require the shipment of serviceable LRUs so that they are received at the FAA site where required, within 24 hours, after receipt of a telephonic request from the FAA Logistics Center (FAALC) official designated in writing.

b. Priority 2 is replacement which shall require the shipment of serviceable LRUs so that they are received at the FAA site where required, within 48 hours, after receipt of a telephonic request from the FAALC official designated in writing.

c. Priority 5 is routine repair which shall be completed within thirty (30) calendar days after receipt of a failed LRU by the Contractor

Warranty Service Turnaround Time Requirements (Priorities) are designed to communicate the **urgency of need** at the requiring site so that the FAA and the Contractor can recognize the extent of the urgency and react accordingly.

The following procedures shall be used during the warranty and extended warranty period:

1. The FAALC will provide Warranty Management service, including an Item Manager, for the VSBP System. This service will be staffed 24 hours per day, 7 days per week in order to receive warranty requirements from FAA sites.

2. The FAALC Item Manager is Dayna Logan and she can be reached at (405) 954-2628 during the hours of 0800 to 1630 local time at FAALC. During non-duty hours, the FAALC priority desk will provide the required warranty service interface. The phone number for the priority desk is (405) 954-4088.

3. The FAA sites will use the Logistics and Inventory System (LIS) to requisition replenishment parts through the FAALC.

4. The following guidance for VSBP Warranty Service is effective upon the delivery of the first VSBP system approximately mid-June 1996:

a. Commissioned sites may utilize P1, P2 or P5 Warranty Service.

Justification for P1: P1 should be used if there is a high potential for creating a major disruption in the air/ground communications between air traffic controllers and pilots.

Conditions for P1: The VSBP is non-operational and the item is not carried as a site spared item or in the case of a spared item, the site spare has been previously used.

b. Non-commissioned sites may utilize only P2 or P5 Warranty Service.

Justification for P2: P2 should be used if there is a potential for creating a disruption in the air/ground communications between air traffic controllers and pilots.

Conditions for P2: The VSBP is non-operational and the only site spare has been used to make the system operational.

c. P5 may be used for routine repairs when the above justification and conditions do not apply.

5. The site supervisor is responsible for ensuring that all requisitioners are aware of their responsibilities to avoid the use of unjustified or unnecessary high priorities. The site supervisor has approval authority for determining whether the Urgency of Need justifies a P1, P2 or P5.

6. The FAA site sends the requisition to the FAALC Item Manager through the LIS using VSBP as the APP code for action. During non-duty hours the FAALC priority desk will take the necessary action.

7. The FAALC will fill the requisition from on hand stock and respond in accordance with the assigned priority. If the item is not available, the FAALC will send the requisition to either Tellabs or DME, depending on the item, utilizing the warranty Response Service hotline.